Authorial Reference and Rhetorical Functions in Research Articles of Mathematics and Linguistics

Hoyoon Eun

(Jeonbuk National University)

Eun, Hoyoon. (2022). Authorial reference and rhetorical functions in research articles of mathematics and linguistics. *The Linguistic Association of Korea Journal, 30*(4), 191-210. This study explores how academic authors of different fields present themselves in the text and how they build up authorial identities with rhetorical functions of authorial referential expressions. The corpus for this study is comprised of 72 research articles (RAs) written in English in the areas of mathematics and linguistics. The frequency of authorial referential expressions was analyzed statistically and their rhetorical functions were also investigated qualitatively, based on Hyland's (2002) classifications. The results report the significant overuse of first-person plural pronouns in the corpus of mathematics although the corpus consists of all single-authored RAs. Meanwhile, various types of authorial referential markers are used in the corpus of linguistics. Also, authors of linguistics select more diverse rhetorical functions than the ones of mathematics. We can say that a discipline influences the choice of authorial referential markers more significantly than a language. The study ends with suggestions that EAP learners and RA authors should be more aware of authorial reference and their rhetorical functions.

Key Words: authorial reference, rhetorical function, research article, EAP

1. Introduction

Over decades, the traditional ideas that academic writing is objective and impersonal have been superseded by the new understanding that academic texts are full of various rhetorical devices to build up the authorial identity (Hyland, 2002; Martínes, 2005;

Sheldon, 2009; Kafes, 2017; Li, 2021). There have been a lot of studies on rhetorical devices (e.g., hedge, booster) found in diverse genres of academic writing (e.g., research articles (RAs), degree dissertation) (Hyland, 2002; Ivanic & Camps, 2001; Salager-Meyer, 1994; Eun, 2020).

Of them, RAs have been given a lot of attention since the traditional conventions of RA natures have changed so much. Typical traditional conventions of RA are to keep to impersonal, distant and modest writing, not to use first person pronouns too much, to use passive sentences, and so forth. Especially, RAs of natural science fields have been recommended to write with passive sentences (Sheldrake, 2001). These are still available, but this trend is being challenged with the ever-growing recognition of the need for the negotiation of authorial identity in RAs (Tang & John, 1999).

The successful articulation of RAs depends on the author's competence not only to convey original ideas but also to build up a credible scholarly identity which meshes with the disciplinary community (Ivanic & Camps, 2001; Harwood, 2005). Recent studies report that more and more RA authors instill their own voices, claim clearly, communicate with their audiences, present themselves in the texts and build up their identities under disciplinary conventions (Kafes, 2017; Swales, 2004; Charles, 2003; Hyland, 2000).

The concept of 'identity' is a complicated and contentious issue. It has public, social as well as private, inner aspects (Ivanic, 1998). The identity is built on the relationship or interaction with the discourse community. The authorial identity of RAs is inseparable from the text and performs significant pragmatic roles to spread the author's ideas and persuade readers efficiently. There have been a lot of studies about the authorial presence and identity of RAs, focusing on ethnic groups, cultures, disciplines, authorial status in discourse community, languages, and so on (Martín-Martín, 2003; Kafes, 2017; Starfield & Ravelli, 2006, McGrath, 2016; Li, 2021).

Of them, several researches of the authorial references and identities of RAs focusing on disciplines have been done, based on inter-disciplines, intra-discipline (Hyland, 2002, 2003, 2011; McGrath, 2016; Chen, 2020). These studies dealt with several academic fields broadly at a time. There have been few studies which investigated two specific academic areas of RA in depth.

In this situation, I set the goal of the present study to investigate how authors present themselves and build up their authorial identities in single-authored RAs of mathematics and linguistics. Both areas were chosen because I wanted to compare RA features in the areas of both humanities and natural science. Also, I wanted to analyze their pragmatic

competence (i.e., rhetorical functions) in both corpora. The pragmatics competence is defined as the ability to use language socially and discursively appropriately (House, 2013). To do this, quantitative and qualitative approaches (i.e., rhetorical analysis) were applied. My study poses the following research questions:

1) What expressions do RA authors of mathematics and linguistics use for authorial reference?
2) How do RA authors of both groups use rhetorical functions of authorial referential expressions?

2. Review of the Literature

2.1. Authorial Reference

One of the advances in the area of pragmatics and discourse analysis about academic writing is that RAs do not belong to a domain where the delivery of the contents is all that matters. In order to carry their ideas effectively, RA authors not only reveal themselves but also hide themselves in various ways (e.g., passive voice) in the text. That is, they expand or shrink their presence in the text with the most visible manifestation (e.g., I, we), third person NPs (e.g., the researcher) or inanimate NPs expressions (e.g., this paper, this study) (Hyland, 2002). In doing so, they spread their ideas carefully, persuade readers, negotiate with them and gradually build up their authorial identities. There are several factors to decide how they present themselves in the text: culture, authors' status in the discourse community, language proficiency, research field, language, education style.

Chen (2020) studied authorial referencial expressions and pragmatic competence in the Chinese and English texts written by Chinese authors and reported that the culture played a more significant role in writing style than the language. Namely, Chinese authors conformed to the modesty culture of China no matter which language they used, English or Chinese. Meanwhile, Choi (2021) reported that authors' status in the discourse community was a significant factor to decide authorial referential expressions from her study on the English RAs of applied linguistics written by Korean novice authors (i.e., postgraduates) and L1 English expert authors.

Kuo (1999) did an empirical study of personal pronouns in RAs of three scientific

fields (computer science, electronic engineering, physics) and reported that authors of English RAs of sciences used first person plural pronouns a lot more than other authorial referential expressions. Martínez (2005) investigated English RAs of biology written by L1 English and Spanish authors and found far more occurrences of first person plural pronouns in both corpora. Other studies also concluded that disciplines of RAs influence the use of authorial referential expressions significantly (Hardwood, 2005, 2006; Hyland, 2001, 2002; Khedri & Kritsis, 2020). Hyland (2001) showed that there are interdisciplinary differences in the use of authorial reference between soft disciplines (e.g., applied linguistics, sociology) and hard sciences (e.g., biology, engineering).

Sheldon (2009) investigated RAs written in English and Spanish and analyzed the different identities behind the roles of the first-person subject in both corpora. She explained that the construction of self-representation is influenced by the writing culture of each group. Kafes (2017) compared English RAs written by Turkish and English L1 authors and concluded that the collectivism culture of Turkey influenced writing style significantly. There are other studies of cross-languages and cross-cultures: Italian (Molino, 2010), Polish (Hryniuk, 2018), five European languages (Vassileva, 1998), Korean (Lee, 2014).

Li (2021) recently investigated authorial presence of the first person pronouns in RA abstracts in a diachronic way and revealed that current authors tend to reveal their presence in the text freely and two personal pronouns (*I* and *we*) performed several discourse functions.

2.2. Authorial Identity and Rhetorical Functions

Authorial identity is not only an individual but also a cultural notion, which is constructed via writing style (e.g., lexical expression, syntax, organization). This identity is related with authority, which implies the power that the author contributes to the research of the relevant academic area.

Tang and John (1999) considered the authorial identity as the collection of identities and divided it into six functions: a representative of a group, the guide through the essay, the architect of the essay, the recounter of the research process, the opinion-holder and the originator.

According to them, their subjects (the first year students of Singapore University) felt that using first person singular pronouns to perform the last two roles (i.e., the opinion-

holder, originator) was the most difficult. It means that this avoidance of first person singular pronouns results from a need to mitigate the authority in academic authorship.

Whereas, Hyland (2002) broke the authorial identity into a set of functions: stating a goal/purpose, explaining a procedure, expressing self-benefit, elaborating an argument, and stating results/claims.

He explains that the former three display a lower degree of authority, while the latter two manifest a lot more powerful and explicit authorial identity. His subjects (students of Hong Kong University) tended to shy away from the first person singular subject in the section of 'stating results/claims', compared with expert writers.

The above two studies make a proposal concerning the subtle nature of authorial identity, that is, authors negotiate their identities when they are involved in an academic discourse. Further, this negotiation may be delicate and complicated, which influences authors' choices of authorial reference significantly.

A successful L2 learner is referred to as the one who acquires pragmatic competence as well as linguistic competence. Namely, a skillful L2 learner not only acquires the rules and lexicon of the target language but also uses the target language appropriately for the situation (House, 2013).

There have been a variety of investigations for pragmatic competence: factors for the acquisition of a specific pragmatic competence (Kasper & Rose, 2001), the relationship between pragmatic competence and linguistic competence (Bardovi-Harlig, 1999), how to teach pragmatic competence (Kasper & Rose, 2001).

A lot of researchers explained that culture is the most significant factor in the development of learner's pragmatic competence (Chen, 2020; Kasper & Rose, 2001; Thompson, 1996). To name a few, the lack of exposure to the culture of the target language could hinder a learner's acquisition of pragmatic competence. Young and Brown (2014) reported that learners of the Korean language had a lot of difficulty in mastering the use of forms of address, because of insufficient exposure to Korean culture.

In the text of academic writing, a pragmatic competence is necessary for authors to spread their ideas and persuade readers, through which they adopt various rhetorical devices. Of them, authorial referential expressions are useful devices for conjugating a pragmatic competence. In the RA text, authorial referential expressions play significant rhetorical functions (e.g., stating a goal of the study, explaining a procedure).

Including Tang and John (1999) and Hyland (2002), there are several kinds of classifications of rhetorical functions used in RAs (Ivanic, 1998; Sheldon, 2009; Starfield &

Ravelli, 2006). Of these classifications, I adopted Hyland's (2002) classifications.

Based on these former studies, I wanted to investigate what expressions RA authors of both mathematics and linguistics used for authorial reference and how they use rhetorical functions of authorial referential expressions.

3. Methodology

3.1. Corpus Compilation

The corpus for this study is comprised of single-authored RAs written in English and published in world-renowned journals in the disciplines of mathematics and linguistics. To build up parallel sub-corpora, the first step was to select five leading journals in each area, which I chose from the list of SCOPUS journals. The five journals of mathematics were selected as follows; *International Journal of Mathematics & Mathematical Sciences, Journal of Applied Mathematics, Journal of Mathematical Sciences, Journal of Mathematics and Statistics, Journal of Mathematics and Computer Science.*

In the same way, five journals in the field of linguistics from the list of SCOPUS journals were also adopted; *International Journal of Applied Linguistics, Journal of English for Academic Purposes, Journal of English Linguistics, Journal of Linguistics, Journal of Pragmatics.*

Next, ten single-authored RAs of each journal were chosen at random, which were published between 2011 and 2021. Downloaded texts were preprocessed through which tables, figures, reference lists, acknowledgement, abstract, keywords, titles, notes, formulas, other peripheral information (e.g., information of authors) were all deleted. The deleted size of mathematics texts was much larger than the one of linguistics texts. The size of both corpora became disparate and several texts of linguistics were excluded from the present study to keep the balance of the corpus size. The final composition of both corpora is shown in Table 1:

Table 1. The Corpora

Corpus	Number of texts	Number of words
Mathematics	50	185,243
Linguistics	22	185,502

3.2. Analysis

To examine the authorial referential expressions in RAs, the current study adopted 17 expressions drawn from former studies (Kafes, 2017; Chen, 2020; Choi, 2021). They were categorized into four types; first person singular pronouns, first person plural pronouns, third person NPs, inanimate NPs (see Table 2).

Table 2. Expressions for Authorial reference

Types	Authorial referential expressions
First person pronoun (*sing.*)	I, my, me, mine
First person pronoun (*pl.*)	we, our, us, ours
Third person NPs	the writer, the author, the presenter, the researcher
Inanimate NPs	the paper, the study, the investigation, the article

For the next step, the corpora were examined with the above expressions using the concordance and word list programs of *AntConc 4.1.3*. After all the expressions were compiled, I checked their exact meaning one by one as to whether it referred to the author in the text. If it referred to the author of the text, I included it in the corpus. If not, it was excluded from the corpus (see the below (1) and (2)).

(1) *The study* by [22] was crucial since it aids in determining the possibility for each bank to enhance total liability, profit, earnings, and total goal attainment in order to meet the benchmark target value for future development. (mathematics, RA3)
(2) *This study* adopts an inclusive view of modal markers, as it recognizes that modality in English can be marked via a large range of lexicogrammatical means. (linguistics, RA14)

The study in the example of (1) referred to the specific study done by 〔22〕 in the text, while *this study* of (2) meant the author of the text. Thus, only (2) was included in the corpus.

After this sorting process, the corpora were finally compiled for this study. The independent *t-test* was applied statistically to analyze the usage of authorial reference found in both corpora with *SPSS 25*. Statistical figures clearly showed the usage of

authorial reference between both groups. For the final step, rhetorical functions of the authorial referential expressions from both corpora were examined rhetorically with the relevant examples.

4. Results & Discussion

4.1. Frequency and Distribution of Authorial Reference

The first step for analyzing authorial reference between both corpora was to compare the frequency according to four types. Table 3 presents the frequencies of occurrence and the relative percentage of four types of authorial referential markers.

Table 3. Frequency of authorial reference

Types	Mathematics			Linguistics		
	Frequency		Normalized	Frequency		Normalized
	No.	%		No.	%	
First person pronoun (*sing.*)	10	0.43	0.1	288	40.62	1.6
First person pronoun (*pl.*)	2285	98.92	12.3	274	38.65	1.5
Third person NPs	1	0.04	0	4	0.56	0
Inanimate NPs	14	0.61	0.1	143	20.17	0.8
Total	2310	100%	12.5	709	100%	3.8

As shown in Table 3, salient disparities are found between both corpora. Above all, the overall frequency of authorial referential markers is found almost three times more in the corpus of mathematics (12.5 cases) than in the corpus of linguistics (3.8 cases). This significant preference in frequency between two corpora is statistically meaningful, as indicated by the results of independent *t-test* (see Table 4).

As we see in table 4, three types of authorial self-referential markers used in both corpora show statistical difference (first person singular pronouns: $t = 4.715$, $p = .000$, first

Table 4. Results of independent *t-test*

Types	Mathematics		Linguistics		*t*	*p*
	M	*SD*	*M*	*SD*		
First person pronoun (*sing.*)	.20	1.161	12	17.752	4.715	.000
First person pronoun (*pl.*)	46.63	41.957	11.42	17.098	–3.943	.000
Third person NPs	.02	0.141	0.17	0.565	1.738	.086
Inanimate NPs	.28	0.701	5.96	4.903	8.077	.000

p<.05

person plural pronouns: t = -3.943, p = .000, inanimate NPs: t = 8.077, p = .000). Especially, we can also find that authors of mathematics prefer the first person plural pronoun *we* overwhelmingly although the corpus of mathematics is all single-authored. This preference of the first person plural pronoun found in the corpus of mathematics is in congruence with the previous studies whose corpora were natural sciences (Kuo, 1999; Hyland, 2001). Meanwhile, the use of third person NPs between both corpora was not statistically different (t = 1.738, p = .086). In the next section, more detailed observations of authorial referential markers were stated one by one.

4.2. Authorial reference

Each type of authorial reference was explored with relevant examples excerpted from both corpora. To begin with, in the case of first person singular pronouns *I/my/me/mine*, the most visible manifestation, authors of both groups selected them when they wanted to express the personal situation. See the examples (3) and (4).

(3) He also told *me* that such a definition is too restrictive and seems to confirm concordance in the case of the quasi-arithmetic means only. (mathematics, RA19)

(4) Some speakers were not able to be precise about how long they had lived where; in these cases, *I* made *my* best estimates based on what they were able to tell *me*. (linguistics, RA11)

The significant disparity of this type was found between both corpora (t = 4.715, p = .000) The authors of linguistics used them much more than the ones of mathematics. It means that authors of linguistics did not hesitate to show themselves in the text, clearly spread their ideas and stood out. However, the authors of mathematics seemed tentative to reveal themselves in the text. They promoted the objectivity and the reliability of the text, showing the facts (e.g., formulas, graphs, chart) rather than presenting themselves personally in the text.

Next, in the case of first person plural pronouns *we/our/us/ours*, I could find them in the corpus of mathematics a lot more than linguistics although both corpora are all single-authored. Especially, most of authorial referential markers used in the corpus of mathematics are dominantly first person plural pronouns. Look at the examples of (5) and (6).

(5) The outline of this paper is as follows. *We* begin with an introduction to knowledge space theory (KST), where we review the basic concepts and existing results that are needed for this work. (mathematics, RA41)

(6) In this section, *we* have seen that meaning based on the indexicality of variants of linguistic variables can occur with any of the three intention relations in (4). (linguistics RA16)

In the examples (5) and (6), *we* refers to not only the author but also the reader, which is called an 'inclusive *we*[1].' With this 'inclusive *we*', the author tries to involve the readers into the research and wants to persuade them. We can also infer another reason that they want to lessen their authorial presence and distance themselves in the text with *we* because *I* is clearly visible in the text and might be regarded strong or subjective. For these reasons, authors of both corpora use *we* instead of *I* in spite of all works being single-authored.

Generally, the academic writing of natural science has been recommended to use passive sentences rather than active sentences since passive sentences usually omit the agent, which is useful for the agent to hide themselves in the text (Sheldrake, 2012). This passive writing style is helpful for showing the objectivity of the research and modesty to the readers.

---

1) The opposite concept, 'exclusive *we*' is that *we* does not include reader (or listener).
e.g., *We* will follow you.

Thus, before the research, I anticipated that a lot of passive sentences could be found in the corpus of mathematics, but the result was unexpected. That is, in order to hide themselves, most authors of mathematics chose a different rhetorical device, 'inclusive *we*' instead of passive sentences.

In the process of compiling single-authored RA corpora for this study, the only criteria was a discipline. I did not care about other factors; gender, nationality, language, author's status of discourse community, and so forth. Thus, we can infer that this disparate writing style of first person pronouns in both corpora results from the difference of disciplines.

We can say that there is a writing culture in each academic field. Authors prepare their texts, considering the writing culture of each area since their readers are professionals in their field and they must pass peer-review to publish their RAs in journals. Thus, it can be said that the discipline is a significant factor to decide the writing style in the academic text. This result coincides with the previous results (Kuo, 1999; Hyland, 2001).

The examples of (7) and (8) show that authors of both corpora represent their authorial presence with third person NPs.

(7) Recently, *the author* has proved [3], in a rather simple way, that ... (mathematics, RA29)
(8) Prior to this study, *the researcher* conducted a departmental survey asking EAP teachers their perceptions on the reliability of their marking. (linguistics, RA6)

The example of (7) is the only case of third person NPs referring to the author in the corpus of mathematics. In the corpus of linguistics, there were a few cases of third person NPs which referred to the author. Other authorial referential markers (i.e., the writer, the author) were also found in the corpus of linguistics. RA authors seemed to use this rhetorical device for the purpose of diluting the authorial existence, so that their RAs looked more objective, factual and scientific not subjective. However, authors of both corpora did not use them much, which means that they were not accustomed to employing this rhetorical device.

The below example of (9) and (10) report the use of inanimate NPs which refer to authors in both corpora.

(9) Unfortunately, as _this article_ will show, essentially all ideal point IRT models' I θ exhibit these behaviours. (mathematics, RA42)

(10) An understanding of these differences is generally a key component of any discussion and/or formal training in second and/or foreign/world language teaching methodology (_this article_ will use the term "world languages"), and... (linguistics, RA1)

The metonymic expression _this article_ in the examples of (9) and (10) refers to the author of the text. Impersonal forms of authorial reference (e.g., passive voice, personifying expressions) help authors notify the reliability, the objectivity and ultimately the authority to their readers and discourse community (Rundbald, 2007). Moreover, the choice of these impersonal forms may be related to the intention to produce a text that conforms to the expectation of the author's invisibility with a discourse community. That is, how authors position themselves in the discourse community they belong to, and how they build up the relationship with their readers are significant factors of the choice of authorial reference (Molino, 2010; Choi, 2021).

4.3. Rhetorical Functions

The investigation of frequency of authorial reference and its statistical data offer us a lot of significant information about its usage of authors of both corpora as we have seen the above. On the other hand, the rhetorical functions for which the authorial reference used in both corpora also provided plenty of significant information. Based on the Hyland's (2002) classification about rhetorical functions of authorial reference, I looked into the cases of each function, compared the rhetorical functions of both corpora and analyzed them in detail.

4.3.1. Stating a Goal/Purpose

RA authors employed this rhetorical function "to signal their intentions and provide an overt structure for their texts." (Hyland, 2002, p. 1100). This function plays a role in describing author's goals, purposes and topics of the study. It hardly carries the threat of criticism or objection. It also helps inform the direction of the research and the overall structure of the argument, and put authors in a less risky role since it indicates the way to spread the research.

(11) Since _we_ aim to prove that this expression is greater than one, we observe the terms corresponding to primes not included in ρj increase the value of the result by a factor greater than one. (mathematics, RA39)

(12) _I_ aim to show the advantages of an indirect mapping of form and meaning in a processual approach, such as the current one, in accounting for the (paradigmatic) suffixation of the compound marker -(s)I in the formation of Turkish NNCs and its (unexpected) absence in certain derivatives. (linguistics, RA18)

As shown in the examples of (11) and (12), authors of mathematics never used _I_, the subjective case of first person singular pronoun. They used _my, me,_ its objective and possessive cases only a few times. Whereas, authors of linguistics selected first person singular/plural pronouns, regardless of the cases. Moreover, they used other authorial referential markers (e.g., this study, the writer) freely for this rhetorical function.

4.3.2 Explaining a Procedure

Authors of both corpora employed authorial referential markers as a conductor of research who plays the agentive role in the research process, specifying the field covered. They used these markers, highlighting not only their expertise in their area, but also their attempt to gain their readers' credibility by validating the framework. See the examples of (13), (14) and (15).

(13) In this section, _we_ conduct various experiments on leukemia and multiple myeloma data sets and discuss the results. (mathematics, RA2)

(14) For instance, if _we_ used _de verdade_ 'seriously, honestly' or _efectivamente_ ' indeed' to detect the non-epistemic uses of certamente, it would soon become obvious that such expressions do not provide _a complete_ match ... (linguistics, RA21)

(15) In coordination with _the researcher_ conducting this study, a testing coordinator from the company selected a series of writing and speaking prompts designed for the company' s newest STAMP 4S proficiency exam ... (linguistics, RA1)

As shown in the examples of (13), (14) and (15), authors of mathematics, they still preferred _we_ to any other authorial referential markers. They outlined their methodology, fulfilling the expectation of journal and academic community. Whereas authors of

linguistics, they chose various markers (e.g., I, we, the researcher, this study) without reserve. We can infer that they attempted to elaborate the research methodology with affirmative textual effects and reassure readers that the final result would be of a high standard. They also emphasized the objectivity of the research, downplaying their presence with the third person NPs and inanimate NPs.

4.3.3. Stating Results/Claims

When authors of both corpora state results and claims, they explicitly announce their presence, underline their role and build up a plausible interpretation for the phenomenon. They confidently address readers with the first person singular/plural pronouns, the most assertive and face-threatening way of authorial reference (Hyland, 2002). See the examples of (16), (17), (18) and (19).

> (16) To summarize, *this paper* proposed a combination of a restricted version of the MELS and CFA. *We* showed how to estimate the model's parameters and how the effects of covariates can be estimated. (mathematics, RA44)
>
> (17) In the second place, *this study* provides two significant implications for language instructors. (linguistics, RA2)
>
> (18) *I* have shown that distribution and morphosyntax are not primary criteria for categoriality and, thus, proposed that such 'mismatched' categories (e.g. participles) are best not analysed as mixed projections. (linguistics, RA17)
>
> (19) In this article *we* have examined the use of LAs in a comparable corpus of CNS and ENS RAs written in English. (linguistics, RA10)

The example of (16) shows that authors of mathematics still mitigated their presence with inanimate NPs and first person plural pronouns. They displayed knowledge of the research with care and emphasize the objectivity of the study, still following the writing convention of their academic field faithfully. Meanwhile, as shown in (17), (18) and (19), authors of linguistics select diverse authorial referential markers appropriately, suitable for the context and their pragmatic purpose.

4.3.4. Expressing Self-benefits

RA authors often include comments on what they personally gained from the research. Thus, of six rhetorical functions, 'expressing self-benefit' is the least face-threatening function.

(20) However, I hope to have demonstrated that the notion of epistemic CG management can help _us_ make better predictions about the communicative intentions of speakers, both in Upper Napo Kichwa and beyond. (linguistics, RA23)

The above example of (20) is the only case used for this function in both corpora. According to Hyland (2002), this function usually does not occur in professional writing since it is a personal statement found in a conclusion. As authors of this study are experts in each field, it is rare to find this rhetorical function in the corpus.

4.3.5. Elaborating an Argument

This function is used for highlighting author's opinions or arguments, which is usually presented with the first person singular/plural pronouns. Novice writers such as students often attempt to disguise their responsibility when elaborating arguments and giving opinions. It is because they want to avoid the potentially problematic role which carries accountability (Hyland, 2002).

(21) _We_ argue that this finding may be caused by item-feature effects: affirmative items are perceived as more similar to one another than to reverse-worded items and vice versa, which can account for the additional dimension in a factor analysis. (mathematics, RA46)

(22) For this reason, _I_ believe that only if students become acquainted with other academic discourses from early stages on, can multilingual publishing ultimately be fostered in significant ways. (linguistics, RA10)

The examples of (21) and (22) show that authors of both corpora emphasized their own ideas and used cognitive verbs (e.g., think, believe, assume) as well. Authors of mathematics still preferred _we_, which shows their faithful conformity to the writing convention of their area. Whereas, authors of linguistics selected _I_ in the example of (22), but other markers were also used, meshed with the context and the rhetorical functions.

5. Conclusion

This study explored the way RA authors of mathematics and linguistics present themselves and build up their authorial identities in the text, through quantitative and rhetorical analysis on single-authored RAs of both fields. It also investigated their pragmatic competence (i.e., rhetorical functions) used in both corpora.

The finding of the study reported that authorial reference of both corpora showed different aspects. That is, authors of mathematics selected the first-person plural pronoun *we* overwhelmingly, while the writers of linguistics used various types of authorial referential markers, appropriate for the context and rhetorical purposes.

Hyland (2001, 2002, 2003) and Hardwood (2005) stated that personal pronouns are preferred in soft disciplines rather than in hard ones. Indeed, authors in soft disciplines select the first person singular pronoun *I* more often, whereas those in hard sciences show a preference for the plural *we*.

The overuse of the first person plural pronoun *we* in the disciplines of natural science and engineering has been reported in previous studies (Kuo, 1999; Martínez, 2005; Gao, 2018; Hyland, 2001). This rhetorical strategy is a typical way for authors to dilute their identities and persuade readers to participate in the study. To do this, there is another rhetorical device, the passive voice, but authors of mathematics adopted the first person plural pronoun *we* rather than the passive voice. The use of authorial referential markers by both groups showed statistically meaningful difference and it can be said that authors of both corpora conform to the writing convention of each discipline faithfully.

Authors of both corpora used rhetorical functions effectively. However, authors of linguistics used them more diversely. It can be inferred that authors of mathematics conjugated tables, figures, graphs, formulae, and so forth to spread their ideas rather than rhetorical devices.

The study on the authorial reference let us know how authors present themselves in a discourse community and construct their authorial identities in the text. There are several factors to decide the choice of authorial referential expressions. Of them, if we compare which is more significant, language or discipline, we can say that a discipline is more significant because both corpora were written in English. It is congruent to former studies (Fløttum et al., 2006; Gao, 2018).

Research on authorial identity and rhetorical functions in RA can produce a lot of benefit in academic life. It can provide assistance in the professional development and

training of academic researchers, helping them become aware of the writing conventions and expectations of their disciplinary field, as well as the possibilities available to them to express their personality within the boundaries of disciplinary conventions. It is also useful in EAP writing instruction, since it encourages learners to explore texts in depth and analyze them rhetorically, helping them understand how authors write with the independent voice and build up their authorial identity while conforming to the disciplinary writing culture.

With this study, I recommend that EAP learners and RA authors should be more aware of authorial reference, pragmatic competence (i.e., rhetorical functions). If so, they will be able to spread their ideas more efficiently and their writing will be understood more smoothly by the readers from diverse cultures.

References

Bardovi-Harlig, K. (1999). Exploring the interlanguage of interlanguage pragmatics: A research agenda for acquisitional pragmatics. *Language Learning, 49*(4), 677-713.

Charles, M. (2003). 'This mystery...': a corpus-based study of the use of nouns to construct stance in theses from two contrasting disciplines. *Journal of English for Academic Purposes, 16*(1), 3-14.

Chen, R. (2020). Single author self-reference: Identity construction and pragmatic competence. *Journal of English for Academic Purposes, 45,* 203-214.

Choi, Y.-H. (2020). Authorial references in single-author research articles of L2 English student writers and L1 English authors. *Korean Journal of English Language and Linguistics, 21,* 226-246.

Eun, H.-Y. (2020). Study on hedges and boosters in the conclusions of research articles. *English Language & Literature Teaching, 26*(3), 19-37.

Fløttum, K., Dahl, T., & Kinn, T. (2006). *Academic voices: Across languages and disciplines.* Amsterdam: John Benjamins.

Gao, X. (2018). A cross-disciplinary corpus-based study on English and Chinese native speakers' use of first person pronouns in academic English writing. *Text & Talk, 38*(1), 93-113.

Hardwood, N. (2005). Nowhere has anyone attempted...In this article I aim to do

just that: A corpus based study on self-promotional *I* and *we* in academic writing across four disciplines. *Journal of Pragmatics, 37,* 1207-1231.

Hardwood, N. (2006). Appropriate personal pronoun use in political science: A qualitative study and a proposed heuristic for future research. *Written Communication, 23*(4), 424-450.

House, J. (2013). Developing pragmatic competence in English as a lingua franca: Using discourse markers to express (inter) subjectivity and connectivity. *Journal of Pragmatics, 59,* 57-67.

Hryniuk, K. (2018). Expressing authorial self in research articles written by Polish and English native-speaker writers: A corpus-based study. *Studies in Second Language Learning and Teaching, 8*(3), 621-642.

Hyland, K. (2000). *Disciplinary discourses: Social interactions in academic writing.* London: Longman.

Hyland, K. (2001). Humble servants of the discipline? Self-mention in research articles. *English for Specific Purposes, 20*(3), 207-226.

Hyland, K. (2002). Authority and invisibility: Authorial identity in academic writing. *Journal of Pragmatics, 34,* 1091-1112.

Hyland, K. (2003). Self-citation and self-reference: Credibility and promotion in academic publication. *Journal of the American Society for Information Science and Technology, 54*(3), 251-259.

Hyland, K. (2011). The presentation of self in scholarly life: identity and marginalization in academic homepages. *English for Specific Purposes, 30*(4), 286-297.

Ivanic, R. (1998). *Writing and identity: the discoursal construction of identity in academic writing.* Philadelphia: John Benjamins.

Ivanic, R., & Camps, D. (2001). I am how I sound: Voice as self-representation in L2 writing. *Journal of Second Language Writing, 10*(1-2), 3-33.

Kafes, H. (2017). The use of authorial self-mention words in academic writing. *International Journal of Language Academy, 5,* 165-180.

Karahan, P. (2013). Self-mention in scientific articles written by Turkish and non-Turkish authors. *Procedia - Social and Behavioral Sciences, 70,* 305-322.

Kasper, G., & Rose, K. (2001). *Pragmatic development in a second language.* Oxford: Blackwell.

Khedri, M., & Kritsis. K. (2020). How do we make ourselves heard in the writing

of a research article? A study of authorial references in four disciplines. *Australian Journal of Linguistics, 40,* 194-217.

Kuo, C.-H. (1999). The use of personal pronouns: Role relationships in scientific journal articles. *English for Specific Purposes, 18*(2), 121-138.

Lee, Y.-J. (2014). A study on the 'authorial self-mention' of journal articles in Korean. *Research on Writing, 20,* 231-266.

Li, Z. (2021). Authorial presence in research article abstracts: A diachronic investigation of the use of first person pronouns. *Journal of English for Academic Purposes, 51,* 100977. DOI:10.1016/j.jeap.2021.100977.

Martín-Martín, P. (2003). A genre analysis of English and Spanish research paper abstracts in experimental social sciences. *English for Specific Purposes, 22,* 25-43.

Martínez, I. (2005). Native and non-native writer's use of first person pronouns in the different sections of biology research articles in English. *Journal of Second Language Writing, 14,* 174-190.

McGrath, L. (2016). Self-mentions in anthropology and history research articles: Variation between and within disciplines. *Journal of English for Academic Purposes, 21,* 86-98.

Molino, A. (2010). Personal and impersonal authorial references: A contrastive study of English and Italian linguistics research articles. *Journal of English for Academic Purposes, 9,* 86-101.

Rundblad, G. (2007). Impersonal, general, and social: The use of metonymy versus passive voice in medical discourse. *Written Communication, 24,* 250-277.

Salager-Meyer, F. (1994). Hedges and textual communicative function in medical English written discourse. *English for Specific Purposes, 13,* 149-170.

Sheldon, E. (2009). From one *I* to another: Discursive construction of self-representation in English and Castilian Spanish research articles. *English for Specific Purposes, 28,* 251-265.

Sheldrake, R. (2001). Personally speaking. *New Scientist,* 19 July.

Sheldrake, R. (2012). *The science delusion: Freeing the spirit of enquiry.* London: Coronet.

Starfield, S., & Ravelli, L. (2006). The writing of this thesis was a process that I could not explore with the positivistic detachment of the classical sociologist: Self and structure in New Humanities research theses. *Journal of English for Academic Purposes, 5,* 222-243.

Swales, J. (2004). Research genres: Explorations and applications. Cambridge: Cambridge University Press.

Tang, R., & John, S. (1999). The 'I' in identity: Exploring writer identity in student academic writing through the first person. *English for Specific Purposes, 18,* S23—S39.

Thompson, L. (1996). The development of pragmatic competence: Past findings and future directions for research. *Language in Society, 3,* 3-21.

Vassileva, I. (1998). Who am I/who are we in academic writing? A contrastive analysis of authorial presence in English, German, French, Russian and Bulgarian. *International Journal of Applied Linguistics, 8,* 163-190.

Young, E., & Brown, L. (2014). Negotiating pragmatic competence in computer mediated communication: The case of Korean address terms. *CALICO Journal, 31*(3), 264-282.

Hoyoon Eun
Lecturer
Department of English Language and Literature
Jeonbuk National University
567, Baekjedae-ro, Deokjin-gu
Jeonju, Jeonbuk 54896, Korea
Phone: +82-63-270-3199
Email: hyeun@jbnu.ac.kr